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SHOPPING BEHAVIOR OF CUSTOMERS IN MODIFIED AND CONVENTIONAL LAYOUTS OF RETAIL FOOD STORES

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SHOPPING BEHAVIOR OF CUSTOMERS IN MODIFIED AND CONVENTIONAL LAYOUTS OF RETAIL FOOD STORES 1/

The past 3 decades have witnessed fundamental changes in food retailing. There has been a sharp decrease in store numbers, partly because food chains instituted a program of replacing small grocery stores with fewer but larger stores. Additional display space has been required to accommodate new and growing product lines. As recently as 10 years ago, supermarkets averaged less than 10,000 square feet and stocked fewer than 4,000 items. Today, however, the typical supermarket stocks over 6,000 items and has nearly 20,000 square feet of space. This 30-year period also witnessed the near elimination of clerk service by the introduction and adoption of self service. As self service became dominant, the sale of a product in a retail food store became increasingly dependent upon its location relative to the flow of customer traffic and its ability to attract the customer's attention. The basic requirement for a sale is that the shopper and the product offered for sale must meet. This is commonly referred to as customer-product exposure.

Problems of store layout and customer-product exposure have intensified as size of store and number of products handled have increased. To display the multitude of products more effectively and to attract and hold customers, many new ideas in store layout are being tried. Some of these ideas in store layouts exercise a degree of control over the flow of customer traffic; other layouts emphasize ease of customer shopping or freedom of movement within the store. Research indicates a significant relationship between dollar value of purchases and distance traveled by customers through a store's selling area. Consequently, questions have been raised concerning various types of store layouts and their effects on customers' shopping behavior.

One new layout calls for departments selling perishable products to be located in the approximate center of the store's selling area and dry groceries on the perimeter. Variations of this concept range from the ultramodified to the semi-modified, depending upon its departure from conventional store layouts. Modified layouts are characterized also by relatively short, low gondolas or cases, especially in the center of the store, which permit the customer to see a large proportion of the store's selling area; many cross-aisles; and greater departmentalization. Traditional or conventional layouts have dry groceries in the middle of the store's selling area, with produce, meat, and dairy departments at the sides. The conventional layout is often referred to as a "gridiron" layout because of the similarity in appearance between it and the yard markings of a football field.

Researchers of the Economic Research Service first studied the modified store layout in Ohio. The study was repeated later in New York and Nebraska, using a modified and a conventional store layout in each area. Each pair of stores was an outlet of the same chain and was selected by officials of the chain to be as nearly alike as possible with respect to factors other than layout which might affect shopping behavior--for example, size and location of store and socio-economic characteristics of customers. Stores more alike in size of selling area could have been selected by using outlets of different companies; but size appeared less important than other variables, such as differences in prices, brands, advertising, promotional and merchandising policies, and relative competition of stores from other chains.

For each observed customer, an enumerator noted the path taken, purchases

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made, and other miscellaneous data. When the customer left the store, another shopper was observed in the same manner. This process was repeated until a representative number of records had been completed. In total, the shopping behavior of 1,292 customers with shopping carts was recorded on scaled diagrams of the 3 modified and 3 conventional layouts studied.

A shopper was credited with one purchase regardless of the number of units selected when they were of the same size, brand, and variety.

Customer Characteristics

Differences in customer characteristics were minor between the modified and conventional stores and do not appear to be associated with differences in shopping behavior. Over half of the customers were between 30 and 50 years of age (table 8).

Although customers shopped only slightly longer in the conventional stores than in the modified ones, they made more purchases and spent more money per customer.

Over 30 percent of all customers consulted shopping lists. Customers in both types of layout who used lists averaged 4 more purchases and spent $2.59 more than customers who did not have shopping lists. Shopping-list users visited more of the stores' selling areas than nonusers. In doing so, users of shopping lists were exposed to more items and made more impulse purchases than other customers.

There was only a slight difference by layout in proportion of customers that

Table 8.--Shopping characteristics of customers in 6 food stores, by type of store layout, 1960-62

Characteristic	Modified layout	Conventional layout
	Dollars	Dollars
Average expenditure per customer	8.56	11.40
Average value of each purchase	.61	.63
	Number	Number
Average number of purchases	14	18
Average number of minutes shopping time	22	23
Average number of minutes at checkout	5.4	5.5
	Percent	Percent
Age:		
18 to 30	29	26
30 to 50	53	55
Over 50	18	19
Shopping unit:		
Male or male and children	18	15
Female or female and children	53	59
Couples or couples and children	22	21
Other combinations	7	5

used a shopping list--32 percent in the modified and 35 percent in the conventional store layout. While customers without shopping lists spent significantly less than customers using them, irrespective of type of store layout, the differential was much greater in the modified stores. Customers patronizing modified stores and having shopping lists averaged spending $2.91 more than customers not using lists. In the conventional layout, customers with shopping lists spent $2.04 more. These findings indicate that the modified layout is particularly susceptible to incomplete store coverage and low rates of purchases by customers who have not planned most of their purchases in advance. The low rate of purchases by customers not using shopping lists was a factor contributing to the disparity in number of purchases and dollar value of purchases between all customers of modified and conventional layout stores.

Proportion of Selling Area Covered

The actual path taken by each customer observed was measured and relationships were established between actual distances traveled by customers and total distances that customers could have traveled through selling areas of departments in both store layouts.

Coverage of the conventional stores was greater in each case. Conventional-store customers shopped each department more thoroughly than modified-store customers. Customers of conventional stores covered 52 percent of the distance through the total selling area; in modified-layout stores, shoppers covered only 32 percent. The smallest difference, 3 percentage points, existed between dairy departments of the two layouts. The largest difference in food departments, 15 percentage points, existed between frozen foods departments (table 9).

Purchases by Departments

The percentage of total purchases in each food department was about the same in each type of store layout. Groceries were about 53 percent of the total number of food purchases and frozen foods about 6 percent. The remaining food departments each accounted for between 9 and 15 percent of the product mix (table 10).

About the same proportion of shoppers entered the grocery, meat, produce, and

Table 9.--Proportion of selling area covered by customers in 6 food stores, by type of store layout, 1960-62

Department	Modified layout	Conventional layout
	Percent	Percent
Grocery	48	56
Meat	62	69
Produce	46	52
Dairy	70	73
Frozen foods	47	62
All food departments	48	58
Nonfoods	12	1/ 30
Total store	32	52

1/ One conventional-layout store did not have a separate nonfoods department.

Table 10.--Customer purchases in specified departments as percentages of total purchases in 6 food stores, by type of store layout, 1960-62

Department	Modified layout	Conventional layout
	Percent	Percent
Grocery	53	52
Meat	12	12
Produce	15	14
Dairy	9	10
Frozen foods	6	6
Nonfoods	6	8

dairy departments in the conventional and modified stores. But the percentage of customers purchasing was greater in the conventional stores than in the modified stores in each department except produce. Purchases of produce were 2 percentage points greater in modified-layout stores (table 11).

For frozen foods, a greater proportion of the customers entered this department in modified stores than in conventional ones. Yet, the percentage of customers purchasing frozen foods in modified stores was well below that in the conventional layout. Two factors appeared to be responsible for the disproportionate number of customers entering and purchasing frozen foods in the two types of stores. The frozen food cases in modified-layout stores were of the short variety, which are not conducive to impulse purchasing because they can be shopped easily from the aisles. In addition, customers entering these aisles were counted as entering the frozen food department, whereas some of them may have entered merely because the aisles were a convenient path to something else.

Purchases by Commodity Group

Of the 32 products and groups of products for which data were tabulated, only three commodities--onions, frozen prepared dinners, and citrus fruits--were purchased by a greater proportion of customers of modified-layout stores than of conventional-layout stores (table 12).

Table 11.--Percentage of customers entering and making purchases in specified departments in 6 food stores, by type of store layout, 1960-62

Department	Modified layout		Conventional layout	
	Entering	Purchasing	Entering	Purchasing
	Percent	Percent	Percent	Percent
Grocery	96	92	99	95
Meat	92	66	91	70
Produce	85	78	88	76
Dairy	83	63	85	73
Frozen foods	87	37	76	52
Nonfoods	79	30	95	41

Table 12.--Percentage of customers purchasing specified products in 6 food stores, by type of store layout, 1960-62

Commodity group	Modified layout	Conventional layout
	Percent	Percent
Bread, rolls, and pastry	60	73
Milk	34	40
Cookies and crackers	31	41
Canned vegetables	30	35
Coffee, tea, and cocoa	22	32
Cereal	26	30
Eggs	27	28
Beer and soda	21	26
Chips and pretzels	15	26
Canned fruit	19	25
Dressings and spreads	17	25
Flour and flour mixes	19	24
Spaghetti, rice, dried beans and peas	21	24
Ice cream	17	21
Soup	17	21
Sugar	15	21
Frozen juices	13	21
Bananas	15	19
Frozen vegetables	15	19
Potatoes	18	19
Canned juice	16	17
Preserves and peanut butter	14	15
Canned tomatoes and sauce	10	13
Citrus fruits	16	13
Pet foods	11	13
Gelatins and puddings	8	12
Baby food	8	9
Frozen fish	6	9
Frozen prepared dinners	9	8
Processed milk	6	8
Shortening	8	8
Onions	8	6

Product Location

Product exposure is a critical factor in the modern food supermarket. A well-designed store layout encourages more complete shopping of the store selling area and provides opportunity for a greater number of purchasing decisions. In addition, more uniform and complete shopping of a store can be encouraged further by strategically locating items that are frequently and consistently purchased by a sizable proportion of shoppers. Judicious product location complements good store layout, or, to a degree, compensates for inefficient layouts.

Product arrangement involves locating frequently purchased items so that customers must travel through as much of the store selling area as possible to purchase them. Thus, increased customer exposure is gained for new items, items in temporary oversupply, seasonal products, and impulse items located throughout the store. Also, selective location of individual items may improve store efficiency by distributing customer traffic

flow in such a way as to prevent congestion in some areas and low traffic in others.

In this study, variation in proportion of customers purchasing products was accentuated somewhat by the smaller number of purchases in modified layout stores. Yet, purchasing practices were found in the present study to be generally similar to those of previous findings. For example, in all of the stores studied, canned fruits were purchased by an average of 22 percent of all customers (table 13). Among individual stores, the proportion buying canned fruits would be expected to fall within a relatively narrow range of 17 to 27 percent, in about 2 out of 3 instances. On the other hand, eggs were purchased by 27 percent of customers; among individual stores, the proportion buying would be expected to range from 12 to 42 percent.

The suitability of a product or item for use as a traffic builder is solely dependent on its ability to attract purchasers. Due to many factors, a product that has pulling power in one store may have little or no power in others. Where substantial variation exists among stores in proportion of customers buying, the ability of the product to attract purchasers must be evaluated separately for each store. Canned tomatoes and sauce, for example, were purchased by an average of only 12 percent of customers patronizing the stores studied. But the upper limit of the confidence interval indicates that in a given store the proportion of customers buying might have been as high as 27 percent. An operator of such a store might effectively use this commodity group to increase customer traffic in a particular area, to encourage a more thorough traversing of the store's selling area, or, possibly, to reduce customer congestion by moving the product to another place.

Precepts Developed from Research Findings

New ideas in store layout will continue to be advanced to cope with the increasing problems of expanding product lines and associated problems of customer-product exposure, competition between stores for customers, and customer loyalty. As food retailing changes, so must many guidelines now used in the design of good store layout. However, there are some precepts of store layout that are persistent and stand out in study after study.

Long, unbroken gondolas lend themselves to controlling customer traffic flow. Although a cross-aisle is necessary with extremely long gondolas, cross-aisles distract customers and should be used with discretion. Results of an earlier study strongly indicated that split gondolas reduce the flow of customer traffic and the proportion of the aisle shopped. 2/ In addition, it showed that customers shop short gondolas visually from the gondola end instead of walking through the aisle.

The strategic location of frequently purchased items complements good store layout and compensates for inefficient layouts, to a degree, by encouraging more uniform and complete shopping of a store. Customer traffic in gondola aisles can be increased further by locating price-featured items near the center of the gondola.

Reasonable control of customer movement in the store not only aids store management, but also makes shopping easier for the customer.

While retailers and others directly involved in food distribution are most immediately concerned and stand to benefit most from improved selling efficiency, more efficient retailing has implications for producers of agricultural commodities. Today, growers are almost entirely dependent on others for the sale of their products. How well the distribution function is performed may materially affect the well-being of producers of farm products. As an example, it was found that the proportion of customers buying 29 of 32 product groups was 1 to 13

2/ Havas, Nick, and Smith, H. M., Customers' Shopping Patterns in Retail Food Stores, U.S. Dept. Agr., ERS-99, Dec. 1962.

Table 13.--Proportion of customers making purchases of selected commodity groups in 6 food stores, and coefficients of variation, 1960-62

Commodity group	Proportion of customers purchasing 1/		
	Mean	Coefficient of variation	Confidence limit
	Percent	Percent	Percent
Small variation among stores			
Bread, rolls, and pastry	66	14	54-78
Milk	37	22	26-48
Cookies and crackers	36	19	26-46
Canned vegetables	32	22	22-42
Cereal	28	18	21-35
Beer and soda	23	12	19-27
Canned fruit	22	17	17-27
Dressings and spreads	21	29	13-28
Flour and flour mixes	21	18	16-26
Ice cream	19	21	14-24
Soup	19	21	14-24
Sugar	18	21	13-23
Frozen juices	17	29	10-24
Preserves and peanut butter	15	13	12-18
Baby food	9	22	6-12
Onions	7	29	4-10
Processed milk	7	29	4-10
Medium variation among stores			
Coffee, tea, and cocoa	26	37	12-40
Potatoes	18	39	8-28
Canned juice	17	35	9-25
Pet foods	12	33	7-17
Gelatins and puddings	10	30	6-14
Shortening	8	38	4-12
Frozen prepared dinners	8	33	4-12
Large variation among stores			
Eggs	27	41	12-42
Spaghetti, rice, dried beans and peas	22	41	10-34
Chips and pretzels	21	52	6-36
Bananas	17	41	7-27
Frozen vegetables	17	41	7-27
Citrus fruits	15	67	1-29
Canned tomatoes and sauce	12	92	0-27
Frozen fish	8	57	1-15

1/ The coefficient of variation shows the relative consistency from store to store with which customers would be expected to purchase the products indicated. The confidence limits indicate the interval between which the mean proportion of customers purchasing would be expected to occur in two-thirds of the cases.

percentage points higher in stores with conventional layouts than in stores with modified layouts. In stores with conventional layouts, 40 percent of customers bought milk compared with 34 percent in modified layouts. Bread, rolls, and pastry, as a group, was purchased by 73 percent of customers in conventional-layout stores compared with 60 percent in the modified.

Customer behavior studies also provide growers with information on which action can be taken to influence the retail merchandising of their product. Many groups, representing producers of various agricultural commodities, are currently engaged in self-help programs to improve the demand for their products. These promotional activities include programs directed toward the wholesale and retail trade. Through direct contacts of merchandising representatives and the distribution of point-of-purchase promotional material, producer groups seek to help retailers develop and use merchandising practices that are most efficient in creating demand. Knowledge about the effectiveness of merchandising techniques helps producer groups develop programs that retailers will use.

Because many purchases in retail food stores are made on impluse, it is equally advantageous to producers as well as retailers for every customer to be exposed to as many different items as possible. Maximum consumer-product exposure at retail not only encourages increased purchases but also provides a more sensitive measure of consumer preferences. Without a full understanding or appreciation of consumer preference, neither the retailer, distributor, nor producer can be properly responsive or carry out his function most efficiently.